

---

# Bay Area Freeway Concept of Operations



---

## Vision, Goals, and Objectives

Deliverable No. 5

*Prepared by:*



Kimley-Horn  
and Associates, Inc.

April 13, 2001

091598000

Copyright © 2001, Metropolitan Transportation Commission

## TABLE OF CONTENTS

<b>1. INTRODUCTION .....</b>	<b>1</b>
<b>2. FREEWAY PROGRAM HIERARCHY .....</b>	<b>2</b>
<b>3. FREEWAY MANAGEMENT PROGRAM VISION.....</b>	<b>3</b>
<b>4. FREEWAY MANAGEMENT PROGRAM GOALS AND OBJECTIVES .....</b>	<b>5</b>
<b>5. FREEWAY OPERATIONS GOALS AND OBJECTIVES.....</b>	<b>6</b>
<b>6. FREEWAY CONCEPT OF OPERATIONS GOALS AND OBJECTIVES .....</b>	<b>7</b>

## LIST OF TABLES

Table 1 – Freeway Management Program Goals and Objectives .....	5
Table 2 – Freeway Operations Goals and Objectives .....	6
Table 3 – Freeway Concept of Operations Goals and Objectives.....	7

# 1. INTRODUCTION

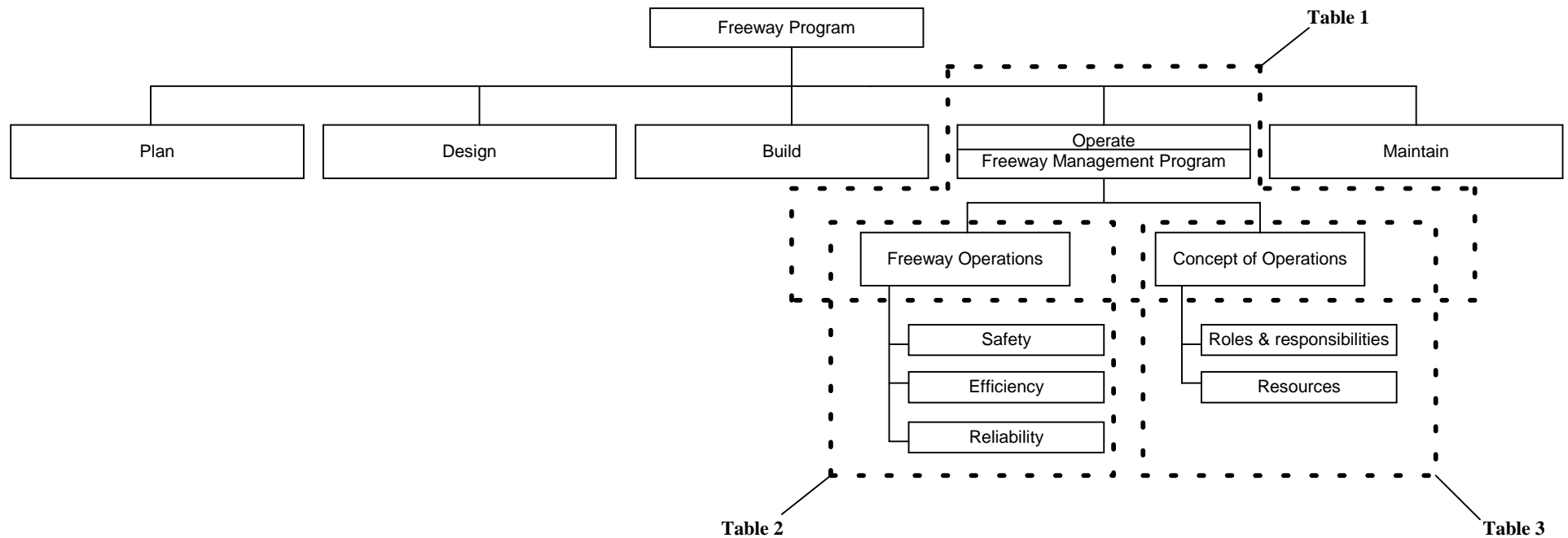
This deliverable first presents a vision statement for the Freeway Management Program in the Bay Area. The vision is followed by the agreed goals and objectives for the Bay Area Freeway Management Program, Freeway Operations, and Concept of Operations.

The Freeway Management Program is an on-going effort by Caltrans, CHP, and MTC to coordinate and manage the activities directly related to the operation of the freeway system in the Bay Area. Freeway Operations refers to the activities that directly affect the safety, travel time, travel route selection, time of travel, or mode of travel, of travelers using or planning to use the freeway network. These activities include conditions monitoring, incident response, ramp metering, etc. This Freeway Concept of Operations project will improve the Freeway Operations policies, procedures, and practices, and build consensus on the roles, responsibilities, and resource needs for Freeway Operations. Phase 1 of the project will result in a Freeway Operations Strategy Report that recommends the future direction for Freeway Operations in the Bay Area, and an Action Plan that will guide future work on the Freeway Concept of Operations.

While there are several components of a **Freeway Program**, there is a comprehensive aim of such a program to improve safety, mobility, efficiency, and quality of life for the travelers who use a regional freeway system. The overall Freeway Program is made up of numerous activities: Planning, Design, Building, Operating, and Maintaining. The activity addressed in this Concept of Operations project is the “Operating” activity. By creating an **overall vision** for the Bay Area **Freeway Management Program**, specific goals and measurable objectives can then be developed to support that vision. The Freeway Program Hierarchy on the following page shows a top-down visual of how the vision, goals, and objectives fit together and interrelate. The objectives of the higher level Freeway Management Program become the goals for the next level down (Freeway Operations and Freeway Concept of Operations). The blocked areas indicate the relationship between the different tables in this deliverable and the Freeway Program Hierarchy.

The vision statement states the overall vision for the program and how it can be achieved. The goals that support the vision are shown in **Table 1**. The study team has approached the goals and measurable objectives in terms of real-time activities (Freeway Operations in **Table 2**) and institutional/policy issues (Concept of Operations in **Table 3**), all of which are integral to successful freeway operations strategies and the freeway management program as a whole. The goals focus on improving real-time operations (recurring congestion, incident management, traveler information) as well as the institutional coordination and cooperation required to support those real-time operations (practices, procedures, policies, resources, roles, and responsibilities).

## 2. FREEWAY PROGRAM HIERARCHY



### 3. FREEWAY MANAGEMENT PROGRAM VISION

A Freeway Management Program is a comprehensive set of planning and operational strategies aimed at improving the safety of motorists, the efficiency of the transportation system, and maximizing the resources of the agencies that are responsible for managing a regional transportation network. The Bay Area Freeway Concept of Operations emphasizes the participation of multiple agencies working with a common set of goals to carry out the vision for optimal operations of the region's overall Freeway Management Program.

*The vision of the Bay Area Freeway Management Program is to meet or exceed customer expectations by minimizing congestion and optimizing the flow of people and goods on the multimodal transportation system.*

*This vision will be achieved by integrating systems and fostering partnerships to cost-effectively manage and operate the region's transportation facilities.*

During optimal freeway operations, the existing freeways will operate at their maximum efficiency; traffic will flow at safe speeds; the freeways will be carrying the maximum number of people and amount of goods; the number and severity of collisions and incidents will be minimized; and when incidents do occur, the impact on freeway operations will be minimized. The vision for the Bay Area's freeway operations is to operate in this optimum condition for the maximum amount of time. When not at the optimum level of operations, the vision is to return the operations to the optimum level as rapidly as possible. To achieve this vision, all regional and local agencies must fulfill their agreed upon roles and responsibilities in accordance with the accepted policies and procedures. To support optimal freeway operations in the region, the following conditions will exist:

- The Bay area's regional and local agencies are communicating, partnering and sharing, and coordinating their activities;
- The regional and local agencies have agreed on their roles and responsibilities related to freeway operations;
- Effective policies and procedures have been developed by the regional and local agencies, they are in place and are being used, and they are documented for easy reference. All agencies abide by these policies and procedures;
- All agencies have adequate funding and staffing to support the optimal freeway operations;
- Intelligent transportation systems are fully implemented and operational to monitor and manage the freeways, to coordinate incident management, and to provide accurate and timely traveler information; and
- Freeways operate reliably at the planned level of service.

To illustrate the vision for the Freeway Management Program, the following scenario describes how the integrated elements of the Freeway Management Program work together to achieve the vision.

The 500 miles of the Bay area's freeway network are monitored and managed by communications and computer systems located in the regional Transportation Management

Center (TMC). The freeway system is continuously monitored using an integrated network of detection and monitoring systems to provide real-time information to the TMC managers and to the public.

When an incident or congestion occurs on the freeway, vehicle detectors along the freeway monitor the volume, speed, and occupancy of the freeway traffic, and this data is analyzed by the computers of the Traffic Operations System (TOS) to identify the conditions. The TMC operators are alerted of the incident or congestion by the TOS, and the closed-circuit television cameras located along the freeway are used to monitor and verify freeway conditions. The Freeway Service Patrol is dispatched to incidents to quickly assist the stranded travelers and help to restore the freeway to normal operations. The California Highway Patrol (CHP) staff in the TMC are monitoring the system and CHP dispatches their personnel, fire, emergency medical services, and towing services to the scene of the incident to respond under a unified plan. Travelers also can call in to the CHP dispatch center using cellular phones and the call boxes along the freeway. These calls provide more information about the incident to local police, fire, and traffic departments linked to the TMC. These agencies are alerted and stand ready to assist as requested to clear the incident and restore the freeway to its optimum operation as rapidly as possible.

To manage the incidents and congestion, the TMC operators place messages on the changeable message signs along the freeways to alert the travelers of the incident or congestion. The metering rates for the ramp meters on the freeway entrance ramps are changed to limit the number of vehicles entering the freeway to reduce the demand. Highway advisory radios are activated to broadcast traffic advisories to the travelers advising them of the incident and conditions. The incident information and the traffic volumes and speeds determined by the TOS are linked to TravInfo<sup>®</sup> and the information is distributed to travelers by broadcast radio, cellular telephones, pagers, Internet, and other electronic equipment. Using TravInfo<sup>®</sup>, the public can get real-time information to plan their trips or use an alternative mode of transportation.

All of these integrated systems and cooperative agencies working together restore the freeway to its optimal operations in a minimal time period. Travelers are kept informed and their inconvenience is minimized resulting in safer and more satisfied freeway users.

#### 4. FREEWAY MANAGEMENT PROGRAM GOALS AND OBJECTIVES

The Freeway Management Program is an on-going effort by Caltrans, CHP, and MTC to coordinate and manage the activities directly related to the operation of the freeway system in the Bay Area.

The vision for the Freeway Management Program is a broad description, and it is intended to provide a basis for specific goals and objectives to support the range of activities that work together to achieve a common vision for enhanced operation and coordinated management of the transportation network.

Goals for the overall Freeway Management Program were developed based on the real-time operational needs of the freeway system as well as the strategies agencies need to have in place to effectively support those operational activities. From these goals, Freeway Management Program objectives were developed. The overall Freeway Management Program Objectives become the Goals shown for Freeway Operations and for Concept of Operations.

**Table 1 – Freeway Management Program Goals and Objectives**

Goals	Objectives
Operate the Bay Area Freeway System in a manner that is safe, efficient, and reliable.	• Improve safety
	• Improve efficiency (usage of freeways)
	• Improve reliability (consistency of freeway operations)
Better manage and coordinate the procedures and resources of agencies involved in Freeway Operations.	• Improve the definition of roles and responsibilities
	• Improve policies, procedures, and practices
	• Improve the coordination of available systems and resources

## 5. FREEWAY OPERATIONS GOALS AND OBJECTIVES

Freeway Operations are the activities that directly affect the safety, travel time, travel route selection, time of travel, or mode of travel, of travelers using or planning to use the freeway network. These activities include conditions monitoring, incident response, ramp metering, etc.

As shown below in **Table 2**, the goals for Freeway Operations are directly correlated with the objectives for the Freeway Management Program. The goals of improving safety, efficiency, and reliability of the freeway system are dependent on several real-time functions of freeway operations, including monitoring, surveillance, incident detection, providing information to motorists, incident clearance, and restoring network capacity. These functions are represented by specific objectives aimed at minimizing recurring and non-recurring congestion, improving overall incident management, and maintaining consistent travel speeds and times on the freeways. Operational objectives for Freeway Operations can be directly traced back to the goals and objectives for the overall Freeway Management Program.

**Table 2 – Freeway Operations Goals and Objectives**

Goals	Objectives
Improve safety	<ul style="list-style-type: none"><li>• Reduce accident rates and severity</li><li>• Improve incident management</li><li>• Improve assistance to stranded motorists</li></ul>
Improve efficiency	<ul style="list-style-type: none"><li>• Minimize recurring traffic congestion</li><li>• Reduce vehicle delay due to construction and event traffic</li><li>• Improve incident management</li></ul>
Improve reliability	<ul style="list-style-type: none"><li>• Improve consistency of travel speeds and travel times</li><li>• Improve incident management</li><li>• Increase monitoring of freeway conditions</li><li>• Provide information to motorists</li></ul>



## 6. FREEWAY CONCEPT OF OPERATIONS GOALS AND OBJECTIVES

The Freeway Concept of Operations project will improve Freeway Operations policies, procedures, and practices, and build consensus on the roles, responsibilities, and resource needs for Freeway Operations. Phase 1 will result in a Freeway Operations Strategy Report that recommends the future direction for Freeway Operations in the Bay Area, and an Action Plan that will guide future work on the Freeway Concept of Operations.

The Concept of Operations focuses on activities that support the operation and management components of the Freeway Management Program. The objectives shown previously in **Table 1**, become the goals for the Concept of Operations. Objectives were developed to support defining and gaining consensus on agency roles and responsibilities as well as ensuring that adequate resources (financial, technical, and personnel) are available to support operational needs. These objectives are aimed at establishing policies and improving procedures across jurisdictions, developing strategies and specific action items to support continued operations, and identify resource needs and best practices for maximizing multijurisdictional resources for freeway operations. The goals and objectives for the Concept of Operations can be directly traced back to the goals and objectives for the overall Freeway Management Program.

**Table 3 – Freeway Concept of Operations Goals and Objectives**

Goals	Objectives
Improve the definition of roles and responsibilities	<ul style="list-style-type: none"><li>• Increase agencies' understanding of freeway operations functions</li><li>• More clearly define agencies' tasks in freeway operations</li></ul>
Improve policies, procedures, and practices	<ul style="list-style-type: none"><li>• Improve each agency's effectiveness in their freeway operations activities</li><li>• Better integrate the activities of agencies' in freeway operations</li></ul>
Improve the coordination of available systems and resources	<ul style="list-style-type: none"><li>• Improve integration of electronic systems</li><li>• Improve coordination of resources across agencies</li><li>• Improve consensus regarding funding and staffing needs</li></ul>